TUBERCULAR ARTHRITIS OF THE HIP JOINT.*

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Other names have been given to this disease, such as morbus coxæ, hip-joint disease, etc. The term hip-joint disease is very objectionable, but has been so long in use and is so generally accepted that it is difficult to get rid of it. Lænnec was the first to teach that some hip-joint diseases are tubercular, and he was soon followed by Virchow and Volkmann. Many at that time believed in the microbic origin of tuberculosis, but none were able to prove it until 1882, when Robert Koch discovered the tubercle bacillus. The time has long since passed when it is necessary to offer proof that the tubercle bacillus is the cause of tuberculosis; it is sufficient here to say that it is always found where tuberculosis exists, whether in the lungs, brain, abdomen, bones or joints, and that artificial tuberculosis can be produced by injecting the bacilli into animals.

The fact that the vast majority of chronic joint diseases are tubercular, and that the bacillus is not peculiar to certain individuals, has a practical bearing upon the diagnosis, prognosis and treatment in these cases. It should be constantly borne in mind that joint tuberculosis is a local disease, and should be treated as such. It is the surgeon's duty to use every effort to prevent the local disease from becoming general. It is rare that tubercular joint-disease ends fatally, except when some other more vital part becomes secondarily affected. While we know that the bacillus is the cause of tubercular joint-disease, we also know that certain auxiliary conditions are necessary for the development of a local tuberculosis. The fact that tubercular inflammation is so frequent in children, and that it begins, as a rule, in some center of growth or development, would indicate that growing tissue offers the necessary requirements for its development. I believe that an injury in the vast majority of cases offers or produces the place of least resistance for the lodgment and development of the tubercle bacillus in joint-disease, because I have seen so many cases in which the disease could be directly traced to an injury that I am satisfied that the same cause exists, frequently when overlooked. Just as a severe injury is liable to be followed by the ordinary phenomena of an acute inflammation, so is a slight injury liable to be followed by a tubercular inflammation. It is usually the active child of a family who is most subject to falls and accidents, who develop a joint tuberculosis. The fact that some tubercular taint can be found in the family history proves nothing, for few families are free from such taint. Tuberculosis of the hip-joint is a chronic destructive disease that results in loss of function and deformity, if not detected in its early stage and treated in accordince with modern methods.

PATHOLOGY.

Tuberculous disease of the hip-joint usually begins in several minute foci in the neighborhood of the epiphyseal cartilage of the head of the femur. Here the circulation is most active and here the newly formed bone is least resistant.

Thus the bacilli carried by the blood stream are more often deported at this point, where, under favoring conditions, induced, it may be, by slight traumatism, the disease is established. The foci coalesce and an area of infected granulations replaces the normal structures. If the local resistance is sufficient, the disease may be confined to the interior of the bone, but in most instances it gradually forces its way into the joint, and the granulation tissue spreading under and over the cartilage, destroys it in its progress.

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The lining membrane of the joint becomes involved in the disease and finally the adjoining surface of the acetabulum as well. In a certain number of cases, the disease begins about the epiphyseal junctions in the acetabulum, and the primary disease may begin in the synovial membrane, although this is uncommon in children.

From a clinical standpoint primiary disease of the acetabulum may be inferred when the patient is particularly susceptible to movements of the trunk, or when lateral pressure on the pelvis causes pain; or when a Roentgen picture shows greater erosion of the acetabulum than of the head of the femur. As a rule, however, the symptoms may be best explained by primary disease of the head of the thigh bone. The appearances in advanced cases, as seen at operation or autopsy, may be summarized somewhat as follows: The head of the femur is deeply eroded, its cartilaginous covering has practically disappeared or is in part still adherent in necrotic shreds. It lies in sero-purulent fluid, surrounded by the gelatinous necrotic granulations that line the capsule and partly fill the enlarged acetabulum. In certain instances the pelvic bones may be diseased or the acetabulum may be perforated, or the shaft of the femur may be involved.

RELATIVE FREQUENCY.

Tuberculosis of the hip-joint is the most common and the most important of the affections of the joints; ranking second to Pott's disease of the spine. In a total of 7,845 cases of tuberculosis disease treated in the outpatient department of the Hospital for Ruptured and Crippled in New York City, in 15 years, from 1885 to 1889, 3,203 were Pott's disease, and 2,230 were hip disease, while the remaining 2,412 cases included all the other joints.

Age.—Hip-joint disease is essentially a disease of early childhood, although no age is exempt.

Sex.—Sex exercises but little influence, although the disease is slightly more common among males than among females.

Side Affected.—In disease of this as of other joints, the right is somewhat more often affected than the left.

ETIOLOGY.

Three factors are recognized in the etiology of tuberculosis: the infectious element (the tubercle bacillus), the general predisposition of the patient, and the local condition that favors the reception and growth of the bacilli.

Predisposition. — The predisposition both general and local, is spoken of as lessened vital resistance. A general predisposition to this disease may be inherited, or it may be acquired. This history of tuberculosis in the immediate family of the patient is supposed to imply a lessened resistance to this form of disease. In a certain proportion, perhaps 25 per cent. of the cases, this inherited predisposition is very direct and positive, but in the larger number the family history is as indefinite as in a similar class of patients under treatment for any other form of ailment. The acquired predisposition is of more direct importance, since it would indicate the lowering of the vitality due to improper food and improper hygienic surroundings of every variety, together with the greater liability to depressing diseases and the more constant exposure to tuberculous infection that such conditions imply. Thus tuberculous disease of the bones and joints, as well as other parts, is more common among the poor of cities than among the more favored classes.

Mode of Infection.—The tubercle bacilli may be introduced into the system by inhalation and find their way to the bronchial glands, or by the mouth and set up disease in the mesenteric glands, or, after infection of the nasal passage or neighboring parts, secondary disease of the cervical lymphatics may appear in the so-called scrofulous glands of the neck.

Latent Tuberculosis.—It may be assumed that disease of the bronchial and mesenteric glands is not uncommon in persons of apparently perfect health, since it is often discovered at autopsies in those who have died from other causes. This form of glandular disease is called latent tuberculosis, and it usually precedes a local outbreak in the bone or elsewhere. In many instances the disease may remain latent and finally disappear, or it may persist and from time to time free bacilli or bits of infected tissue may escape into the blood current; by it they are deported into other parts, where, under favoring conditions, local disease may be set up. Depression of the vitality from any cause may be supposed to favor the progress of the glandular disease, which may lead to a dissemination of the infectious elements, and at the same time it may lessen the resistance of other tissues that may be exposed to the infection. This accounts for the well-known influence of certain diseases such as measles and whooping-cough, not only in predisposing to local tuberculous disease, but in favoring its progress when it is already established. It is, however, possible that the bacilli that have found their way into the blood current, may set up primary disease of a bone or joint. In fact, it is stated by Koenig that in 14 of 67 autopsies on subjects who had suffered from tuberculous disease of the bones and joints, no other foci were found in the body. And in other instances the source of infection may be pre-existent disease of the lungs or of other internal organs.

SYMPTOMS.

Tuberculous disease of the hip-joint is a chronic, insidious affection, characterized by occasional exacerbations of more acute symptoms that are induced by overstrain or injury, by a more rapid advance of the destructive process, or by infection with pyogenic germs. In the early state of the disease the joint is simply sensitive, and the symptoms vary according to the activity of the disease. which may increase the tension within the bone, the susceptibility of the patient and the strain to which the weakened part is subjected. This sensitiveness is shown by the involuntary adoption of the body to the weakness of the affected part, or as popularly expressed, the patient favors the leg. The first symptom usually noticed is a slight limp. A limp in a child should never be considered a trifling affair, but should always lead to a careful examination of the lower extremities, because it is the first evidence of a number of grave diseases. The hip limp is peculiar and can be recognized readily. It is due to tenderness and muscular spasm. The spasm reduces the amount of free motion in the joint, and when the patient steps forward with the affected limb, instead of bending the hip freely he bends the spine and swings the pelvis and the limb forward together. Muscular spasm and consequent limitation of motion develop very early, and are the most important symptoms from a diagnostic standpoint. This spasm is probably reflex, and is due to the irritation of the nerves supplying the joint. Nature is trying to put the joint at rest by placing all the muscles on guard. This constant contraction of the muscles very soon causes deformity. There is always flexion, sometimes with abduction and outward rotation, but more frequently with adduction and inward rotation. Where abduction is present at first it soon changes to adduction. This change is not due to intra-articular pressure, because it takes place when there is no effusion in the joint. It is undoubtedly due to the muscular spasm. When abduction and outward rotation are present there is apparent lengthening. The affected limb seems to be longer than its fellow, whether the child is lying on his back or standing. The position is due to tilting of the pelvis. With adduction and inward rotation there is apparent shortening. In the early stage of the disease the shortening is only apparent, but later may become real on account of destruction of the head of the bone. Pain may be very slight or very severe in the early stage. It is usually a prominent symptom, and is more frequently located at the inner side of the knee. The patient may be entirely free from pain all day and suffer all night. When the child is suffering and the thigh is flexed, he will usually be found with the bottom of the foot of the well side resting on the instep of the affected side, making an effort at extension. In the beginning of what is sometimes called the second stage, all the symptoms of the early stage are exaggerated. The deformity is increased and the shortening may be real. Pain is a constant symptom and the "night-cries" begin. This nightcry is quite peculiar; it is a loud shriek occurring when the child is asleep. The cry may be so loud as to waken others, but the child may not waken. It is probably due to a sudden spasm of the muscles, causing pain of short duration. Abduction may be present, but adduction is the usual position. The deformity is well marked and atrophy is decided. The limp is increased, and the patient may not be able to stand upon the limb. The gluteo-femoral crease has entirely disappeared and the joint is quite fixed. In fact, the symptoms are all so well marked that the laity can make the diagnosis. Unfortunately, it is at this late stage that the child is brought to the surgeon. In addition to the symptoms that have been described we may have suppuration and abscess, and, if the joint can be moved, crepitation may be felt. The original focus of disease has broken down, and all the joint structures are involved. Abscess as a complication occurs in a large percentage of cases that have not been recognized and properly treated in the early stage of the disease. The presence of an abscess usually indicates that suppuration is going on in the joint, although it may be entirely peri-articular, owing to the breaking of the original focus outside of the capsule of the joint. At this stage of the disease a peri-arthritis is present and can usually be felt around the trochanter. There is fever, the temperature ranging from 99° to 102° F., and it is greatest when the abscess has opened and sinuses are present. At the time when the original focus breaks through into the joint, there is a decided rise of temperature, and after an abscess has broken externally the patient suffers from a rise of temperature, due to infection of the abscess cavity by pyogenic germs. This usually disappears after a few days, but occasionally the patient rapidly emaciates and dies, the high temperature continuing until death. During the latter stage of the disease the general health suffers greatly, and death occurs from tubercular meningitis, pulmonary tuberculosis, and amyloid changes in the liver and kidneys.

DIAGNOSIS.

The diagnosis offers no difficulty when the symptoms are all well marked, and when the characteristic deformity is present, but it is of the utmost importance that it be made at an early date in order that the treatment may be successfully applied. The temperature offers no help in diagnosis, because it varies so, and may be entirely absent. The pain located at the inner side of the knee is suggestive, but not conclusive. The fact that no pain exists is no proof of the absence of hip-joint disease, because cases occur without pain. Deformity helps to make the diagnosis, but it is important to make the diagnosis before this symptom is well marked. A certain amount of deformity occurs at a very early date. Another very valuable symptom is muscular spasm. The spasm is gentle involuntary jerking in the opposite direction from that in which the limb is being moved. It is a very constant symptom, but should be noted early in the examination, since repeated manipulations tire the muscles so that the spasm may disappear for a time. When involuntary resistance to motion in every direction is present with muscular spasm, the joint is diseased beyond question; for while many things may interfere with motion in certain directions nothing else will give this complete train of symptoms. Spasm will be found in all stages of the disease, so long as any motion in the joint remains, and its disappearance is evidence of recovery. Then, manipulations can be satisfactorily performed upon patients of any age, if the surgeon exercises patience and confines his manipulations to the sound limb until he has gained the patient's confidence. The family history is of no value in making a diagnosis; in fact, it is rather misleading. The general condition of the patient is rarely of value in diagnosis, since the general health is rarely affected until the disease is well advanced.

A number of affections are to be differentiated from hip-joint disease. It is very frequently pronounced rheumatism, but should not be, because rheumatism is an acute polyarticular disease. Pott's disease in the lumbar region may be mistaken for hip-disease, for at a very early period it is occasionally difficult to make a differentiated diagnosis between these two affections. In Pott's disease there is the characteristic rigidity of the spine, and except where a psoas abscess is crowding directly upon the joint the limitation of motion is in the extension only, motion in the other direction being quite free. The patient can stand upon the limbs without causing pain, and manipulation of the limb does not cause spasm except in extension.

ATROPHY.

Atrophy is an important sign of hip-joint disease. It is often appreciable to the eye and to the hand, and is always demonstrable by measurement. It is an important symptom because, if well marked, it shows that the disease must have existed for some time, whatever may be the statement of the patient's relatives. The atrophy affects the muscles of the entire limb, although it is somewhat more marked in the muscles of the thigh than in the calf. In the ordinary case of hip disease in childhood, when the patient is first brought for treatment, it averages from one-half to one inch in the thigh and somewhat less in the calf.

The X-Ray in Diagnosis.—Roentgen pictures are of far more value in demonstrating deformity than in establishing early diagnosis of disease, especially at the hip in early childhood, when so large a part of the extremity of the femur is cartilaginous. The pictures are of value, however, in showing the destructive effects of the disease on the head of the femur or acetabulum, and thus giving one a clearer conception of the actual condition of the joint than would be possible otherwise. In older subjects it might be possible to demonstrate the presence of disease in the interior of the bone by this means, but in any event Roetgen pictures are of value only when interpreted by knowledge of the physical signs.

TREATMENT.

The treatment of hip-joint disease may be divided into constitutional and local. If mentioned according to their importance it would be local and constitutional. It should be remembered always that it is primarily a local inflammation, and should be treated as a local affection.

The local treatment is either mechanical or operative. Mechanical treatment is applicable in the vast majority of cases. The great principle of treatment in this disease is rest, and the mechanism that carries out the principle best is the one that should be chosen. The best results are not to be obtained by applying exactly the same variety of appliance to every case. There are those who advocate traction, and there are those who advocate fixation. Both methods have their place in the treatment of this affection. The great advantage in simple fixation is that it can be secured by simple means that are always at hand and that can be applied by comparatively inexperienced hands, while traction without confining the patient to bed can only be secured by special appliances that require special skill in their application. While the majority of cases can be successfully treated by simple fixation, a certain number will continue to suffer pain and do badly until traction is applied. On the other hand, there are cases that do better with fixation than with traction. The fact that the advocates of traction and fixation each claim to have proven the superiority of their respective methods by statistics from their practice simply shows that each has acquired special skill in the use of his favorite method, and has given the method credit which properly belongs to his skill. It is not in the interest of exact knowledge upon this subject for each party to compare his own results after his favorite method with his results after a method that he is prejudiced against. If the best results of each faction be compared, they will be found to be practically the same. I believe that the surgeon who is without prejudice in this matter, and who will select his cases for the respective methods, will secure the best average results. When first called to a patient who is suffering severely and who has marked deformity, the surgeon can afford his patient the quickest and surest relief by putting him in bed and applying traction by means of weight and pully, usually called Buck's extension. The amount of weight varies with the size of the patient and in different cases. When the patient is a child half a brick is a good weight to begin with, and it is rarely necessary to apply more than two bricks to an adult, for it is not so much the amount of the traction as its persistency that overcomes spasm. A bag of sand is a very convenient weight, since it can so easily be made lighter or heavier, to meet indications. The amount of weight in a given case should be just what the surgeon finds will overcome the muscular spasm and relieve the pain; too much weight will cause the patient more pain. The tendency on the part of the patient to slide down in bed can be best overcome by elevating the foot of the bed from two to four inches. Theoretically, the traction should be in line with the deformity, but, practically, I have found that it is rarely necessary to make any special provision for this, since the patient will place himself in bed in such a position as affords him the most relief and does him the most good. If taken in the early stage two or three weeks in bed, with proper extension, will usually be sufficient to relieve the pain and overcome deformity. A child that has been suffering without proper treatment until it has become emaciated will often regain its flesh very rapidly under this plan of treatment. The patient should be gotten out of bed as soon as possible, so that he can have the benefit of outdoor life. When the deformity yields promptly to this treatment in bed and the joint is not exceptionally sensitive, the chances are that a fixation apparatus will bring the case to a favorable termination.

I usually apply plaster-of-Paris from just above the knee to the ribs. This material is chosen because it is always at hand, and can be quickly and easily applied, and because it yields good results. It is a great boon in charity work because of its cheapness. The plaster should be applied over a close-fitting garment or a layer of bandage, and should be heavy enough to have the necessary strength without being a burden. The shoe on the well side should be elevated from two and one-half to three and one-half inches, and a pair of crutches used; for if there is not plenty of elevation the child will begin to use the affected limb as soon as weight upon it does not cause decided pain. The cheapest and best way to elevate the shoe is to have a block of light wood the shape of the sole of the shoe, and of the proper height, hollowed out so as to make it as light as possible, and fastened to the bottom of the shoe by screws coming through the inside of the shoe. This block can be painted black and can be made very presentable. If something better is desired a cork sole covered with leather is best. It is needless to say that the elevated shoe should be on the well limb.

The patient must be under the constant care and supervision of a competent physician until all pain and spasm are gone, which will vary from six months to two years. It is not the province of this paper to speak of operative treatment.

CONSTITUTIONAL TREATMENT.

If there is one point that has been emphasized by the newer ideas on the treatment of tuberculosis, it is that everything must be done to strengthen the defenses of the system against the encroachment of the tubercle bacilli, whether it is pulmonary tuberculosis or tuberculosis of joints; the salient idea is to increase the vital resistance by fresh air, sunlight and proper nutrition. To a great extent this plan holds good in surgical tuberculosis, and it is only necessary to instance the remarkable results that have been achieved in recent years in cases of tuberculous affections of the various joints by an outdoor life, particularly at the seaside, and without resort to operative measures. Tuberculosis is still a battle ground between what might be termed the radical surgeons, who see in every tuberculous focus a lesion which must be thoroughly removed, and those who maintain a more conservative attitude, considering operation as only one of the elements in the treatment. In the Bradshaw lectures, Mr. R. J. Godlee, of London, expresses himself in general as favorably inclined toward the new vaccine therapy in tuberculosis. His experience leads him to state that it is impossible at the present time to promise uniformly good results, and that he is far from convinced that it is destined to replace all other medical and surgical measures. When it is considered that many cases recover under hygienic treatment alone, and that no treatment can restore what has been of tuberculosis in different parts of the body irreparably destroyed by disease, it cannot be expected that vaccine therapy will prove more than a valuable adjunct to other treatment.

SUMMARY.

The fact that the vast majority of chronic joint diseases are tubercular in their type, and that the tubercle bacillus is not peculiar to certain individuals, has a practical bearing upon the diagnosis, prognosis and treatment of the case. It is important to remember that joint tuberculosis is a local disease and should be treated as such. It is the duty of the surgeon to detect the disease in its early state and to use every effort to prevent the local disease from invading adjacent tissues and becoming general. It is rare that tubercular joint disease ends fatally unless more vital parts become secondarily involved, such as the brain, lungs, peritoneum. It is known that the tubercle bacillus is the cause of tubercular hip joint disease, it is also known that certain auxiliary conditions are necessary for the development of a local tuberculosis. I believe that an injury in the vast majority of cases produces lowered vitality in the part; in other words, a suitable soil for the development of the tubercle bacilli. Just as severe injury is liable to be followed by acute inflammation, so a slight injury is liable to be followed by a tubercular inflammation. It is usually the active child, who is most subject to falls and accidents, who develops a joint tuberculosis. The fact that some tubercular taint can be found in the family proves nothing, for few families are free from such taint.

PATHOLOGY.

It is a chronic inflammation of a tubercular type beginning in the spongy tissue of the head of the femur (upper epiphysis) or in the acetabulum. In either event the synovial membrane is quickly involved, and there is extensive destruction of the articular cartilage and the bone, with relaxation of the ligaments and spontaneous dislocation.

SYMPTOMS.

A slight limp is generally the first symptom, with some pain and stiffness after an unusual amount of walking. The pain is often insignificant and usually referred to the inner side of the knee. Sudden paroxysmal pains and "night-cries" are frequent as the disease advances. When the effusion occurs in the joint the limb is slightly flexed, abducted and rotated outward. There is slight fullness in the upper part of Scarpa's triangle, and a partial obliteration of the gluteal fold. Tenderness exists about the hip, and forcing the head of the bone against the acetabulum by striking the trochanter or knee is painful. There is noticeable limitation of motion with well-marked muscular rigidity. This is often spoken of as the stage of apparent lengthening. As the disease progresses there is considerable deformity, due to flexion of the limb and tilting of the pelvis, walking becomes more and more painful and the patient finally becomes bedridden. Atrophy of the muscles of the thigh and leg is always present at this state of the disease, and abscesses may appear. Together with these local symptoms there are afternoon fever, loss of flesh and strength, and general bodily weakness. When the head of the bone is destroyed or the rim of the acetabulum has broken down, upward traction of the muscles result in laxation of the head or neck of the bone, and the formation of an abscess in soft tissues. The position of the limb is then changed to one of flexion, adduction and internal rotation. Bony anchylosis and recovery may take place at any period of the disease, but extension of the disease to other organs, and general ill health from prolonged suppuration and suffering, are apt to bring about a fatal termination.

LOCAL TREATMENT.

The local treatment consists of rest in bed, with traction on the extremity by means of weight with pully, and overcomes the pain, muscular spasm and deformity. When this is accomplished, the ambulatory treatment, with fixation by means of the Thomas splint, or the plaster-of-Paris spica, the use of a high-soled shoe on the sound foot, and crutches is to be recommended.

The favorable effect of traction by the Taylor or Sayre traction splint, which allows walking without crutches, is recognized by most surgeons.

CONSTITUTIONAL TREATMENT.

Everything must be done to strengthen the defenses of the system against the encroachment of the tubercle bacilli. The salient idea is to increase the vital resistance by fresh air, sunlight and proper nutrition. This plan holds good in surgical as well as in pulmonary tuberculosis, as is shown by the remarkable results that have been achieved.